



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : E04H 6/18	A1	(11) International Publication Number: WO 91/06731 (43) International Publication Date: 16 May 1991 (16.05.91)
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(21) International Application Number: PCT/IT90/00013

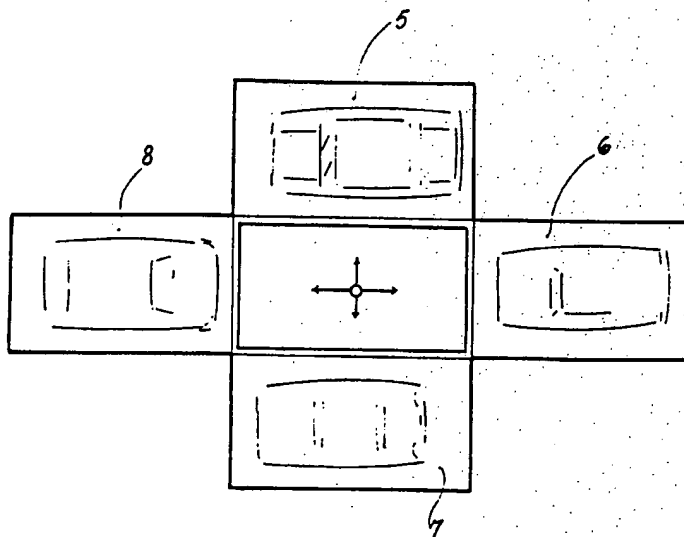
(22) International Filing Date: 9 February 1990 (09.02.90)

(30) Priority data:
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40137 Bologna (IT).(81) Designated States: AT (European patent), AU, BB, BE (Eu-
ropean patent), BF (OAPI patent), BG, BJ (OAPI pa-
tent), BR, CF (OAPI patent), CG (OAPI patent), CH
(European patent), CM (OAPI patent), DE (European
patent)*, DK, DK (European patent), ES (European pa-
tent), FI, FR (European patent), GA (OAPI patent), GB
(European patent), HU, IT (European patent), JP, KP,
KR, LK, LU (European patent), MC, MG, ML (OAPI
patent), MR (OAPI patent), MW, NL (European patent),
NO, RO, SD, SE (European patent), SN (OAPI patent),
SU, TD (OAPI patent), TG (OAPI patent), US.

Published

With international search report.

(54) Title: AUTOMATIZED UNDERGROUND GARAGE



(57) Abstract

The garage is foreseen with an underground construction (1) with central room (2) for setting, with an elevator (3) for transporting the vehicles into one of the possible underground floors (4), since stabling is admitted into any one of the underlying rooms (5, 6, 7 and 8), to each one of which the access is possible from the sides of the relevant loading flatcar (9). The driver leaves his vehicle in delivery position on the loading flatcar (9) arrived at the highest level and controls the car housing either by availing himself of one of his identification means - a magnetic card for instance - or by charging a checking operator of the station. The computer chooses the room among the still available ones and emits a magnetic card by means of which, in due course, it will be possible to control the vehicle back to the surface. The elevator (3) lets the vehicle automatically down to the housing floor and, subsequently, an alternative conveyor (10) hoists and shifts the vehicle into the chosen room. The said conveyor (10) subsequently lowers to release the transported vehicle and, with an inverted movement, is brought back into position, with shape return, on the loading flatcar, allowing the return into position at the higher level.

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"Automatized underground garage".

The invention refers to a completely automatic underground garage which, from a vehicle delivery position on the American basement, lets the vehicle arrive at a garaging position on one of the possible underlying floors and, on demand brings it again into the initial position to be taken back by its user. The steady increase of the circulating vehicles in the town centres has caused the necessity of finding further rooms for garaging either by performing over constructions or below the street level ones. To the first ones, silos for motor-car belong, true metal wheels which bring the vehicle in suspended garaging position; to the second ones, motor-car garages with descending ramps allowing to accede to the underground floors. The first type ones have been carried out in a limited number on account of the high building and management costs as well as to the limited garaging possibilities offered by them. The second type ones can be used either for the dwelling buildings or for public use ensembles, since these stations require a large staff presence for the different duties.

25 The invention allows the solution of the problem by adopting a new conception system which, from one side, foresees a completely automatized operational cycle, thus avoiding the presence of a staff for the vehicle movement and check, and, from the other side, it can be carried out according to the modular construction forms which, consequently, can be easily carried out at low costs.

30 Substantially, the invention foresees an underground construction 1 with a central room 2 for imposing an elevator 3 for the car transport to one of the available lower floors 4 to shed into one of the rooms 5, 6, 7 and 8 with possible access from the side of the relevant loading flatcar 9. The driver leaves the vehicle in delivery condition on the loading flatcar 9, which has reached its highest limit, and controls the car shedding either through one of his identification means - as for instance a magnetic card - or by charging the operation to a checking operator of the station. The computer chooses the shedding room among the ones still available and issues a magnetic card by means of which it will be possible to control the return of the vehicle to the surface. The elevator lets automatically the vehicle go down to the shedding floor and subsequently 45 an alternative conveyor 10 hoists the vehicle and brings it into the shedding position in the chosen room. The conveyor 10 will then lower the disengage the transported car and, with an inverted movement, is brought again into a position of shape reentering in the loading flatcar, thus allowing its return to the upper limit position. 50 Before the descent of the loading flatcar 9, the bars 11 are lowered to preclude the room 2.

55 The system can be used in different ways both within the limits of a use relation and for the direct use particularly

by corporations, joint-dominion buildings, enterprises and, more generically where the exigency is felt of increasing the space to appoint to vehicle shedding.

60 An execution form is illustrated in a merely indicative form, and consequently in a not limiting way, in the drawings of tables 1 and 2. With reference to table 1, fig. 1 is the transversal section of a modular underground construction according to the invention in order to show the system
65 of four hangar rooms on each floor. Fig. 2 is the partial view of a longitudinal section of the same construction to show the loading flatcar 9 of the elevator 3 in delivering position of the vehicle. Fig. 3 in table 2 is a particular of a longitudinal section of an underground floor to show
70 the vehicle brought down to the hangaring floor. Fig. 4 is a view of the same figure showing the vehicle brought in hangaring position into one of the hangaring rooms by the alternative conveyor 10. Fig. 5 is a particular of another longitudinal section displaced by 90° against
75 the preceding one to make evident a vehicle brought in hangaring position into one of the compartments by the alternative conveyor 10.

In the executions, the shape of the hangaring compartments,
80 the lifting and translation devices, the computerized systems and anything else in this connection can be foreseen in different ways. In particular, the hangaring space in the underground floors way be foreseen in different ways and, if required, equipped according to the specific
85 requirements for the use. In particular, the underground construction 1 with the floors 4 and the garaging rooms 5, 6, 7 and 8, can be carried out even by means of modular components manufactured in advance to be fitted together

in a mechanical way. Alternatively, the construction may
90 be executed either partly or completely outwards of the
ground. The possibility has been foreseen of carrying
out either completely or partly underground or out of
the ground, according to the present system by using two
or more loading columns. All components can be replaced
95 with other technically equivalent ones.

Claims.

1) Automatized underground garage characterized by the fact that an underground construction (1) is foreseen with a central rooms (2) fitted with an elevator (3) to transport vehicles into one of the possible lower floors (4), as garaging being allowed in each one of them, in four rooms (5, 6, 7, and 8), from th sides of the relevant loading flatcar(9). The driver brings the car in delivery condition on the loading flatcar (9) arrived at the upper limit, and controls the hangaring either by means of one recognizing document of his, such as a magnetic card, or by charging a checking operator of the station. The computer chooses the hangaring room among the ones still available and issues a magnetic card which, in due course, will enable to control the return of the vehicle to the surface. The hoist lets the vehicle descend automatically and, in succession, an alternative conveyor (10) hoists its, in housing position, into the chosen compartment. The above mentioned conveyor (10) is then lowered to release the transported vehicle and, with an inverted movement, is brought again into position, with reentering shape on the loading floor, thus allowing the return into position at the upper limit.

2) Automatized underground garage, as per claim 1), characterized by the fact that before the descent of the loading flatcar (9), the lowering of the fencing bars (11) is foreseen to shut the central room (2).

3) Automatized underground garage, as per claim 1), characterized by the fact that the underground construction (1) with the different floors (4) and the garaging rooms (5, 6, 7 and 8) can be carried out also with pre-manufactured modular components which can be fitted together in a mechanical way.

4) Automatized underground garage, as per claim 1), characterized by the fact that it can be carried out either partly or completely out of the ground.

5) Automatized underground garage, as per claim 1), characterized by the fact that a construction can be foreseen which uses two or more load hoisting columns.

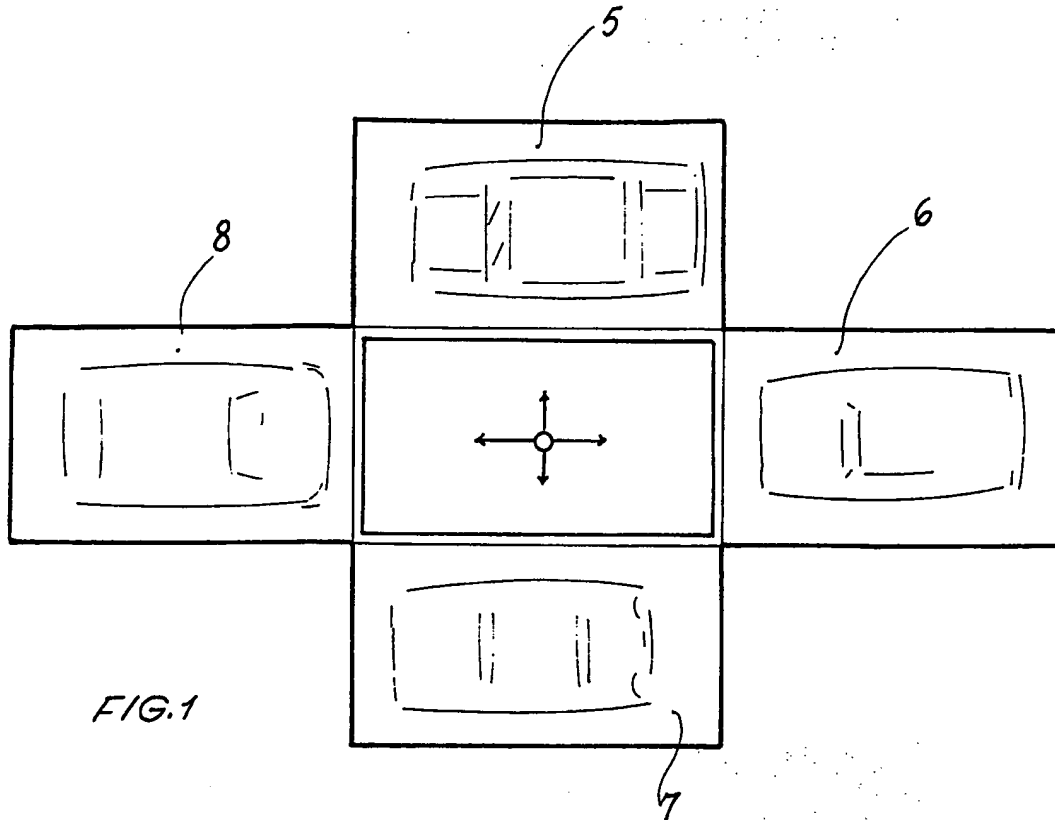


FIG. 1

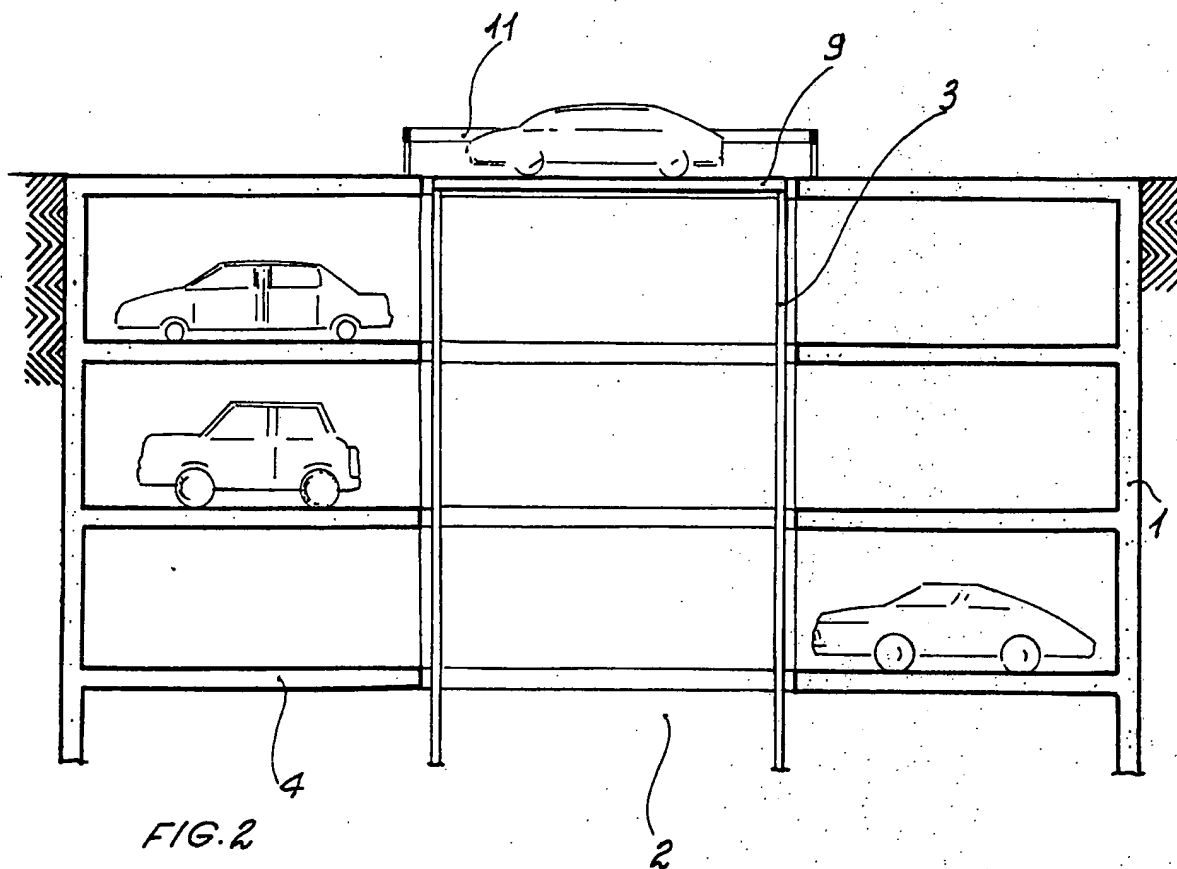


FIG. 2

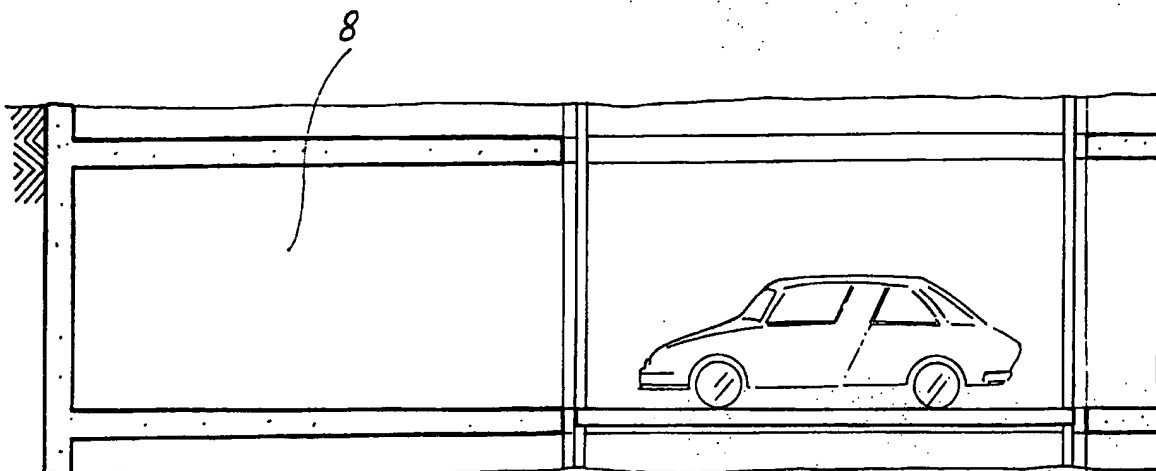


FIG. 3

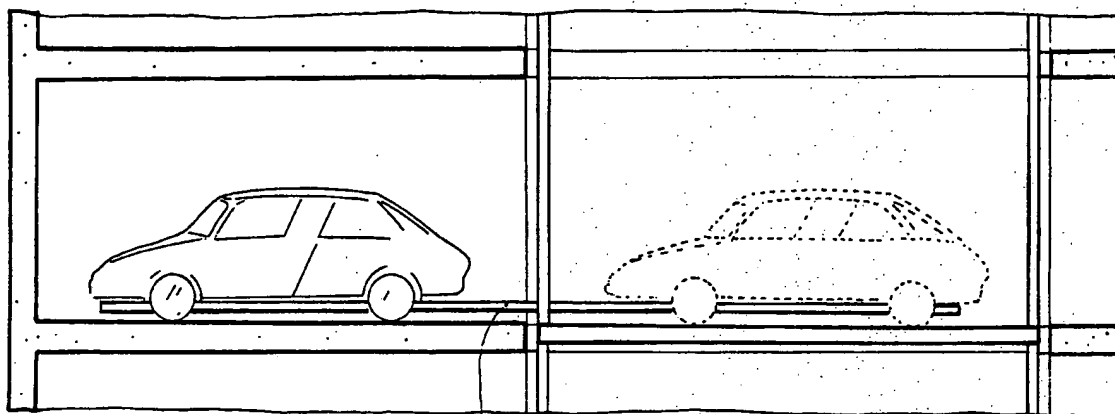


FIG. 4

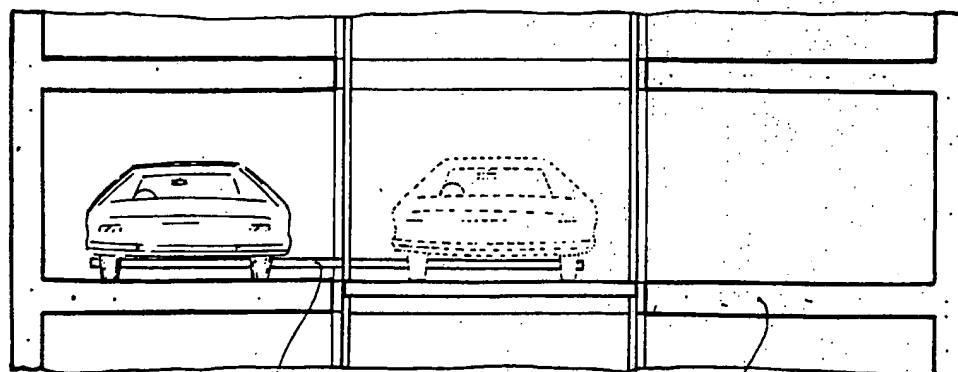


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No. PCT/IT 90/00013

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC ⁵ : E 04 H 6/18																				
II. FIELDS SEARCHED <div style="text-align: center; margin-top: 5px;">Minimum Documentation Searched ⁷</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%; border: none;">Classification System </td> <td style="border: none;">Classification Symbols</td> </tr> <tr> <td style="border: none; padding-top: 10px;">IPC⁵</td> <td style="border: none; padding-top: 10px;">E 04 H, E 04 B</td> </tr> </table> <div style="text-align: center; margin-top: 10px; font-size: small;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸</div>			Classification System	Classification Symbols	IPC ⁵	E 04 H, E 04 B														
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IPC ⁵	E 04 H, E 04 B																			
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; text-align: left; padding: 5px;">Category ⁹</th> <th style="width: 60%; text-align: left; padding: 5px;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 30%; text-align: left; padding: 5px;">Relevant to Claim No. ¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">FR, A, 1376508 (ECGSA S.A.) 1964 see page 2, right-hand column, paragraphs 2-4; page 3, left-hand column, paragraph 3; figures 2-4</td> <td style="vertical-align: top; padding: 5px;">1,5</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="text-align: center; vertical-align: top; padding: 5px;">--</td> <td style="vertical-align: top; padding: 5px;">2-4</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">US, A, 1554584 (S. LAKE) 22 September 1925 see page 2, lines 96-108; figures 2,6</td> <td style="vertical-align: top; padding: 5px;">2</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">DE, A, 2401977 (R. LAUMER) 24 July 1975 see page 5, paragraph 3 - page 8, paragraph 1; figures 1-4</td> <td style="vertical-align: top; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;"></td> <td style="text-align: center; vertical-align: top; padding: 5px;">--</td> <td style="vertical-align: top; padding: 5px;">./.</td> </tr> </tbody> </table>			Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	FR, A, 1376508 (ECGSA S.A.) 1964 see page 2, right-hand column, paragraphs 2-4; page 3, left-hand column, paragraph 3; figures 2-4	1,5	Y	--	2-4	Y	US, A, 1554584 (S. LAKE) 22 September 1925 see page 2, lines 96-108; figures 2,6	2	Y	DE, A, 2401977 (R. LAUMER) 24 July 1975 see page 5, paragraph 3 - page 8, paragraph 1; figures 1-4	3		--	./.
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<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>[*] Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"Z" document member of the same patent family</p> </div> </div>																				
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, " with indication, where appropriate, of the relevant passages	Relevant to Claim No.
Y	US, A, 4776746 (C.-H. PENG) 11 October 1988 see figure 1A --	4
A	FR, A, 1484615 (R.A. ROUGEMONT) 16 June 1967 see page 1, left-hand column, paragraph 11 - page 1, right- hand column, paragraph 1; summary; figures 1-3 --	1
A	FR, A, 1493770 (H. MENARD) 1 September 1967 --	
A	EP, A, 0276525 (N. MATOBA) 3 August 1988 -----	

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US-A- 1554584		None	
DE-A- 2401977	24-07-75	None	
US-A- 4776746	11-10-88	None	
FR-A- 1484615		None	
FR-A- 1493770		None	
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